REMARKS

Claims 1, 3-4, and 7-17, as amended, and new claims 18-19 appear in this application for the Examiner's review and consideration. New claims 18-19 are added to cover preferred embodiments and are supported by paragraph [0057] of the specification so that there is no issue of new matter being introduced. Claim 18 depends from claim 9 while claim 19 is written in independent form combining the features of original claim 1.

The Examiner's identification of certain errors of a typographical nature in the specification has been noted, and these as well as others, have been corrected by amendment. No new matter has been entered in making these changes.

The indication of allowable subject matter in claim 9 is noted with appreciation. Accordingly, claim 9 has been written in independent form, but without the language of the intervening claims as those features are not believed to be needed for patentability. Thus, claims 9-10 and 18 are believed to be in condition for allowance.

Claim 1 has been amended to further define the invention. In particular, claim 1 has been amended to recite that detachment of the layer from the remainder portion is initiated at the super-weakened region by applying a controlled detachment force obtained by heating at least the weakened zone, wherein the heating is controlled for evening the heating applied to weakened zone such that the detachment initiates and propagates from the super-weakened region through the main region to detach the layer from the remainder portion.
Support for this change is provided by claims 2, 4, 5, and 6 as well as by paragraphs [0023] to [0027] and [0042] of the specification. Furthermore, claims 4 and 7 have been amended to be consistent with claim 1. As no new matter has been introduced, the entry of all claim amendments is warranted at this time.

The drawings were objected to for not showing the steps recited in claim 1. Applicants respectfully request reconsideration of this objection. Drawings are certainly not needed to understand the invention, and this is evident by the numerous method patents without drawings that have been issued by the patent office. The present invention is not one in which a logic diagram or flow chart is necessary to understand the invention. Furthermore, even if such a drawing were to be prepared, it would be two boxes connected by a vertical line with a number in each box that is explained in the specification. It is not seen how such a drawing can be needed as there would be no benefit or usefulness provided by it. Instead, applicants' two step

method is well explained in the specification without the need for an illustration of two connected boxes. For all these reasons, it is respectfully requested that the drawings objection be withdrawn.

Claims 1-8, 11-12 and 14-17 were rejected as being obvious over US patent 6,597,039 to Ohmi et al. ("Ohmi") for the reasons set forth on pages 3-5 of the office action, whereas claim 13 was rejected over the combination of Ohmi and US patent application 1003/0234075 to Aspar et al. ("Aspar") for the reason set forth on page 6 of the action.

Ohmi discloses a composite member, its separation method and a preparation method for a semiconductor substrate. In particular, the composite member has a fragile structure with a low mechanical strength, and is particularly suitable for preparing a semiconductor on insulator substrate. Specifically, Ohmi's composite member is formed by bonding a first base substrate 1 and a second base substrate 2 to each other, with a separation area 3 formed inside. The separation area 3 has a portion 31 that is relatively high in mechanical strength and a weak portion 32. The mechanically weak portion 32 is positioned in a peripheral portion of the composite member. Thus, when the composite member is to be separated, such separation is facilitated since the portion 32 that is relatively low in mechanical strength is positioned in the peripheral portion of the composite member, so that that portion 32 is first cracked or collapsed with a mechanical force which then propagates to other portions of the composite member.

Ohmi's FIG. 6A shows that a preferred separation method is one where a wedge 110 is inserted and a force 111 is applied to separate the peripheral portion of the first base substrate 1 from the second base substrate 2. Ohmi also discloses that other separation methods include pressurizing, pulling, shearing, wedge insertion, thermal treatment, vibration application, wire cutting, and by spraying fluid or ejecting a jet of fluid to the vicinity of a side face of the separation area.

The present claims are distinguishable from Ohmi. Claim 1 recites that detachment of the layer is initiated by applying a controlled detachment force obtained by heating at least the weakened zone, wherein the heating is controlled for evening the heating applied to weakened zone such that the detachment initiates and propagates from the super-weakened region through the main region to detach the layer from the remainder portion. Ohmi does not teach how to apply a thermal treatment to accomplish this and apparently relies on other known prior art techniques to supply such a teaching.

And while thermal treatment of a composite substrate is generally known in the art, such techniques can often result in a non-homogeneous roughness of the surface of the removed layer after detachment, as explained in paragraph [0007] of the published specification. Such non-homogenous local areas could be observed on an "as detached " substrate, due to "hot zones" of the furnace that can lead to the initiation of splitting at non-controlled locations (see paragraphs [0042] and [0049] of the published specification for a further explanation of these problems. This problem is a common occurrence and the present application addresses how to correct it.

The present solution to that problem is very different from what is disclosed in Ohmi. That patent is directed to an overweakening the edge of a donor wafer in order to facilitate splitting, in particular when mechanical splitting is employed, since it provides a point where splitting can occur. Such a procedure alone is insufficient to avoid the non-homogeneous roughness that occurs during prior art heating techniques unless additional precautions are taken. This is why claim 1 has been amended to recite that the heating is controlled for evening the heating applied to weakened zone. Ohmi simply does not teach or disclose this feature.

For this reason, the office action states at page 4, lines 16- 17 that "it must be inherent that the thermal treatment was being applied substantially evenly...". Applicants disagree with that statement. There is no explicit feature in Ohmi that the thermal treatment should be even. In particular, paragraph [0049] of the present published application clearly shows to the contrary that thermal gradients have been observed in conventional furnaces and that those gradients lead to non-homogenous roughness of the detached surfaces. To overcome this problem, the present invention utilizes the combination of a super weakened zone in the donor substrate and a uniform heat treatment that allows the initiation of the detachment to be controlled, with this leading to improved roughness condition of the detached surfaces. None of this is mentioned in Ohmi who, as noted above, relies upon conventional detachment techniques in his process. Accordingly, the rejection based on Ohmi has been overcome and should be withdrawn.

As to claim 13, the Aspar patent application does not remedy the deficiencies of the Ohmi patent. Thus, the rejection of claim 13 should also be withdrawn.

Finally, a Supplemental Information Disclosure Statement is enclosed. Applicants have reviewed the references cited therein but do not believe that they are material to the patentability of the claims The Examiner's acknowledgement of this would be appreciated by making the references that are listed on the enclosed PTO form 1449 of record in this application.

Accordingly, as all rejections have been overcome, it is believed that the entire application is now in condition for allowance, early notice of which would be appreciated. In the event that the Examiner does not agree that all claims are now allowable, a personal or telephonic interview is respectfully requested to discuss any remaining issues in an effort to expedite the eventual allowance of this application.

Respectfully submitted,

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Date

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